



MODIFICATION TO SYSTEM 7

The intercepts on this equipment have been marginal for the first two minutes after automatic turn on. The automatic turn on has been operating satisfactorily at approximately $X + 90$ seconds; however, reducible signals have not always occurred until somewhere between $X + 150$ and $X + 200$ seconds.

If the signal strength were increased by several db during this presently unusable portion, analogs could possibly be made more consistently.

There are three areas where improvements could be made which would increase the sensitivity of the system. They are as follows:

1. Antenna Gain -- Changes in the antenna system would require a major overhaul to the operation and would be expensive. Therefore, this is not recommended.

2. Pre-amp Antenna Noise Matching -- An improvement in the noise match between pre-amp and antenna may improve sensitivity. This would require a new pre-amp and the loan of a rams-horn antenna for two months. The theoretical maximum that could be obtained here is 7 db. From a practical standpoint it is hard to say how much could be recovered.

3. Receiver Bandwidth Reduction -- Reducing the receiver bandwidth gives the greatest possibility for improvement at a reasonable price. The system video bandwidth is limited by the recorder response and cannot be

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reduced further without loss of data. However, the IF bandpass of the modified APR-13s may be reduced to 1 mc with a resulting improvement of approximately 3 db in the tangential sensitivity. There is a possibility that another 1 db might be obtained by going to linear detection. This could be handled at the same time the IF bandwidth is modified.

The use of a narrower IF bandwidth may reduce the probability of intercepting a signal in a given RF region by reducing the spectrum coverage.

The use of two receivers tuned to slightly different frequencies with overlapping bandpasses in the signal channel would tend to offset this reduction in probability of intercept. However, it is felt that this disadvantage is more than offset by the resultant improvement in system sensitivity. The reduced bandwidth could also result in a reduction of interference.

The overall system improvement would be difficult to establish without knowing all the details of the environment.

4. Removal of Extracted Sync from Regenerated Video -- The extracted sync may be removed from the regenerated video with a resulting improvement in breakout level. At the present time the analog producers don't use this output because of a serious transient problem following the extracted sync. With this removed the transient problem would not exist.

If the three items suggested here are done, an improvement in sensitivity should result that will permit proper breakout of the signal at X + 90 seconds under similar operating conditions that we have had in the past.

The field maintenance crew may remove the extracted sync from the regenerated video. This may be accomplished by removing the or gate sync diode D104 in crystal ball board. The recording level for the regenerated video should then be increased approximately the mid point or higher in the dynamic range.

In-Plant Work

Staff Engineer	80 hrs @ 13.64	\$ 1,091
Senior Engineer	250 hrs @ 9.77	2,443
Junior Engineer	400 hrs @ 6.78	2,712
Engineer's Assistant	360 hrs @ 4.77	1,717
Shop	60 hrs @ 5.89	353
Draftsman	100 hrs @ 5.45	545
		<hr/> \$8,861

Overseas

Senior Engineer	5 wks @ \$467/wk	2,335
Per Diem	@ 119.70/wk	559
Travel		1,000
G & A @ 14%		140
Material		1,500
G & A @ 14%		210
		<hr/> \$14,605